

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Zhong Dong et al  
Assignee: ProMOS Tech. Inc.  
Title: METHOD OF FORMING ONO-TYPE SIDEWALL WITH  
REDUCED BIRD'S BEAK  
Serial No.: 10/821,100 Filing Date: April 7, 2004  
Examiner: Vu, David Group Art Unit: 2818  
Docket No.: M-15295 US Confirmation No.: 8965

San Jose, California  
March 20, 2008

MAIL STOP Board of Appeals  
COMMISSIONER FOR PATENTS  
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Alexandria, VA 22313-1450

**REPLY BRIEF**

Dear Sirs:

Pursuant to 37 CFR §41.41 this Reply Brief is timely presented in response to the Examiner's Answer of 2/25/2008.

**(A) Identification**

**Appellants/Inventors:** Zhong Dong, Chuck Jang, Ching-Hwa Chen, Chunchieh Huang,  
Jin-Ho Kim, Vei-Han Chan, Chung Wai Leung, Chia-Shun Hsiao,  
George Kovall, and Steven Yang

**Application number:** 10/821,100 **Filed:** April 7, 2004

**Title:** METHOD OF FORMING ONO-TYPE SIDEWALL WITH REDUCED BIRD'S  
BEAK

**Examiner:** David Vu **Art Unit:** 2818

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### **(B) Status of Claims**

Claims 1-15 and 21-28 are pending in the subject application.

### **(C) Grounds of Rejection to be Reviewed**

Claims 1-15, 21-23, and 24 were rejected under 35 USC §103(a) (as applied through §102(e)) as being obvious over You (US 6,706,613) in combination with Wang (US Pub 2005/0110102 published 5/26/05 on basis of an application filed 11/25/03). Reference was also made to Fujimoto (US 6,830,973) and to Xing (2003/0124873) as part of the justification for rejection.

Claims 11, 26 and 27 were rejected under 35 USC §112 as lacking written description support. (No art was applied against claims 26-27.)

Claims 25 and 28 were indicated to contain allowable subject matter.

All rejections are being appealed here, namely those pending against claims 1-15, 21-24, and 26-27.

### **(D) Arguments**

Appellants' job during Appeal is to show reversible error in the proceedings below. *Cf.* Ex Parte Shuping et al. Appeal No. 20080394 (BPAI, 02/05/2008) {"[A] reply by the applicant or patent owner [to a rejection] must . . . distinctly and specifically points out the supposed errors in the examiner's action . . . . The reply must present arguments pointing out the specific distinctions believed to render the claims . . . patentable over any applied references."}

This is done in below argument sections D.1-D.7.

(D.1) **Reversible Error 1a: Failure to correctly ascertain scope and content of prior art teachings**

At Answer page 13, lines 11-14, the Examiner contends:

However, **at no point in You '613 does the reference teach or claim the formation of a nitride layer.** Thus, applicant's argument that the ONO sidewall would not be exposed due to the presence of such a nitride layer is irrelevant. Further, the exposure of the ONO sidewall prior to *the oxidation process* is **clearly depicted in Fig. 2B** of You '613. [*Emphasis added.*]

Appellant respectfully disagrees and further submits that the prima facie basis for rejection crumbles if the Examiner is shown to have failed to properly ascertain this basic aspect of the You '613 reference.

It is well established that a prima facie case under 35 USC §103 must be predicated on an accurate ascertaining of (1) the scope and content of the prior art as such would be understood by one of ordinary skill as well as an understanding of (2) any differences between the claimed subject matter and the prior art, and (3) the level of skill in the art. Graham v. John Deere Co., 383 U.S. 1, 17-18 (1966).

Moreover, when a motivational rationale is presented for varying from the explicit teachings of the prior art pursuant to §103, that motivational narrative must be founded on "**rational underpinnings**" [e.g., factual underpinnings] per KSR Intl. Co. v. Teleflex, Inc., 127 S.Ct. 1727 (2007) [*Bracketed text added*].

KSR (supra) further cautions that a §103 obviousness rejection cannot be based on "distortion caused by hindsight bias and [by lack of caution about] arguments reliant upon ex post reasoning" [*bracketed text added*]. Additionally KSR (supra) holds that "it [is] necessary for a court [or other reviewer] to look to ... the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue. To facilitate review, this analysis should be made explicit." [*Bracketed text added, some text skipped.*]

Given the above reproduction of Answer page 13, at lines 11-14 (**hereafter "Examiner contention D.1"**) and the strong disagreement existing between Appellant and

Examiner regarding the correctness of this simple issue of fact finding, it appears that either Appellant and Examiner are looking at two different documents or that each is reading the You '613 document in a remarkably different way.

It is the Board's task to determine which reading (Appellant's or the Examiner's) has the more rational and factually-based underpinnings.

It is the Board's obligation to determine whether one party has fallen under the blinding spell of hindsight logic and has succumbed to the need for a preordained conclusion irrespective of the actual evidence on record.

Appellant reads You '613 as teaching the skilled artisan to always have a nonoxidizing atmosphere (e.g., N<sub>2</sub>) present at least during heat up preceding the start of flow of dry O<sub>2</sub> at high temperature T2 in order to reduce Bird's Beak. Appellant notes that the Title of the You '613 document ends with the phrase: "Pre-annealing and/or Post-annealing In Nitrogen" [*emphasis added*]. That should be a clue.

By contrast, the outstanding grounds of rejection choose to overlook You's title. The above Examiner contention D.1 ("*at no point in You '613 does the reference teach or claim the formation of a nitride layer*") appears to read You '613 as teaching the skilled artisan to not bother with covering the exposed sidewalls of the ONO stack with a nitride film and to nonetheless expect the preferred results of You Fig. 2C.

Careful examination of the "Pre-annealing" phase of You Fig. 3 shows clear error in the above Examiner contention D.1 ("**at no point in You '613** does the reference teach or claim the formation of a nitride layer").

(Appellant will also address the issue of You Fig. 4; but one thing at a time. It is important to establish some factual predicates before a fair understanding can be had of what the entirety of You '613 teaches to one of ordinary skill.)

Contrary to the above Examiner contention D.1, You does indeed teach the formation of a nitride film on the ONO stack sidewalls at the start of the so-called "oxidation process". The stated function of the formed nitride film is to retard formation of Bird's Beak as You

explains repeatedly in his specification (e.g., col. 6, lines 47-59). But before detailing that point, it is noted that You first teaches at col. 6, lines 17-24 as follows:

When the temperature of the chamber 200 is raised to the processing temperature T2, for example, a temperature of more than approximately 600°C., **a first atmosphere comprising nitrogen (N)** flows into the chamber 200 through the gas inlet 202 so that the substrate 100 is **pre-annealed**. In some embodiments, the first atmosphere comprising nitrogen includes at least one of an N<sub>2</sub> gas, an N<sub>2</sub> O gas and an NO gas.

[Col. 6, lines 17-24, *emphasis added*.]

The person skilled in the art will have no trouble understanding that the above passage applies to the "Pre-annealing" phase of You Fig. 3. In the very next paragraph, You goes on to explain:

Without wishing to be bound by any theory of operation, when the substrate 100 is **pre-annealed with the first atmosphere comprising nitrogen**, a film containing nitrogen appears to be formed on the surface of the substrate 100 and on the sidewalls 102a of the stacked gate 120. Thus, bonds of Si--N **having high bonding strength appear to be generated** at the surface of the substrate 100 and on the sidewalls 120a of the stacked gate 120, while the dangling bonds of Si appear to be reduced. These bonds of Si--N **do not appear to break during the successive oxidation process** so that oxidizing agents do not appear to penetrate into the central portion of the ONO layer 108.

[Col. 6, lines 25-37, *emphasis added*.]

In the next paragraph (col. 6, lines 38-46) You teaches a "dry oxidation process". That is another reversible issue and Appellant will return to it later in this Reply. (The focus here is on showing reversible error in just Examiner contention D.1 taken alone.) Then in the very next paragraph (col. 6, lines 47-59) You explains the function of the previously formed nitride "film" during the dry O<sub>2</sub> flowing part of the oxidation process:

Without wishing to be bound by any theory of operation, the oxidizing agents **do not appear to permeate into the central portion of the ONO layer 108** due to the film containing nitrogen that was previously formed on the surface of the substrate 100 and on the sidewalls 120a of the stacked gate 120 during the oxidation process. Hence, the generation of **the bird's beak can be reduced** or minimized at the ends of the ONO layer 108 (see "C" in FIG. 2C). Thus, the process for oxidizing the gate can be reliably performed because the damaged lateral portion of the ONO layer 108 caused by etching the gate can be oxidized, **without substantial, if any, oxidation of the central portion of the ONO layer 108.**

[Col. 6, lines 47-59, *emphasis added.*]

It is to be noted in the last sentence above that You '613 refers to "the process for oxidizing the gate". It is well established that a patentee may act as his own lexicographer and it is manifestly evident that You has elected to do so with regard to the meaning of "*the process for oxidizing the gate*" as used in the context of col. 6, lines 47-59 and throughout the specification. See for example, *Intellicall, Inc. v. Phonometrics, Inc.*, 952 F.2d 1384; 21 USPQ2d 1383, at 1386-87 (Fed. Cir. 1992) (Where an inventor chooses to be his own lexicographer and to give terms uncommon meanings, he must set out his uncommon definition in some manner within the patent disclosure.)

Confusion about the possible meanings of "*the process for oxidizing the gate*" is understandable given that You '613 appears to be a translation from a Korean priority document and at times the translation is not a model of clarity. Rather than using "*the process for oxidizing the gate*" consistently, You '613 at times reverts to calling it a "method for", or "*a process for oxidizing the stacked gate*" or variations thereof (see col. 5, line 66 for example). At col. 5, lines 43-47, You explains: "In embodiments of the present invention, *the process for oxidizing the stacked gate* can be accomplished using the batch furnace and/or the single wafer rapid oxidation apparatus with various recipes." [Emphasis added.]

After careful study, one of ordinary skill will come to understand that You '613 is using the terminology, "*the process for oxidizing the [stacked] gate*" to refer to at least one of Fig. 3 and Fig. 4 where in both instances, in the "Heating" phase, inward permeation of oxidizing agents is retarded by not yet flowing the dry O<sub>2</sub> and by instead subjecting the exposed ONO sidewalls of Fig. 2B to an atmosphere such as one containing nitrogen as temperature is raised to T<sub>2</sub>. The ONO sidewalls then become covered with a nitride film and the latter retards inward permeation of dry O<sub>2</sub>.

For the embodiment of Fig. 3, You '613 makes it clear that the nitrogen containing atmosphere must be present at the T2 temperature and during the "Pre-annealing" phase. See again the above reproduction (at Reply page 5) of You col. 6, lines 25-37. The Fig. 3 process results in the structure of You Fig. 2C wherein a reduced Bird's Beak phenomenon is highlighted by circle "C", where the latter is to be contrasted against circles "A" and "B" of You Fig. 1. In the latter Fig. 1, the undesirable deep undercut of Poly region 18 and deep overcut of Poly region 14, each extending from "A" to "B", was caused by oxidizing agents permeating through oxide sublayers (not shown) of ONO structure 16 deep into the core of the gates stack. (See You col. 2, lines 27-41.)

Thus, it has been shown here the You '613 explicitly instructs the ordinary artisan to form a nitride film on the sidewall of the ONO gate stack before supplying the dry O2 as an oxidizing agent. Examiner contention D.1 is wrong. As for the same D.1 contention arguing that You not only does not disclose but also does not claim anything having a nitride overcoat, note the "pre-annealing" step required in You claims 1, 11 and 24. Such a pre-annealing step has been demonstrated immediately above to be a step that builds the protective nitride film on the ONO stack sidewall.

So to summarize what is seen thus far from You's teachings: First, if there is no nitride coating over the sidewalls such as is true in the case in You Fig. 1, You teaches that the undesirable deep undercuts and overcuts of the poly gates will occur (extending from "A" to "B" as shown in Fig. 1). By contrast, if the "film containing nitrogen" is formed prior to introducing the main oxidizing agents per You col. 6, lines 47-59 (reproduced above at Reply page 6), then the desired structure of You Fig. 2C (with reduced or minimized Bird's Beak represented by circle "C") will result.

Thus the Examiner's above contention D.1 that "at no point in You '613 does the reference teach or claim the formation of a nitride layer" has been shown to be clearly in error by way of uncontroverted evidence. Accordingly a first instance of reversible error has been demonstrated. The outstanding grounds of rejection are based on a fact finding that fails to correctly ascertain the scope and content of the prior art.

**(D.2) Reversible Error 1b: Further failure to correctly ascertain scope and content of prior art teachings**

The above discussion re contention D.1 does not necessarily end the inquiry because the Examiner's Answer points to col. 7, lines 58-67 as the basis of rejection where the col. 7 content is directed to Fig. 4 of You (see col. 7, line 23) rather than Fig. 3. The Examiner contends at page 5, lines 11-17 of the Answer as follows (**hereafter "Examiner contention D.2"**):

Regarding claims 1-8, ... You discloses in Figs. 2B-2C a method of ... the method comprising subjecting the [**exposed**] sidewall 120a [of Fig. 2B **directly**] to a thermal oxide process to form a sidewall oxide (**[per] Fig. 2C and col. 5, lines 29-37)** and forming an [*sic*] supplemental nitride sidewall dielectric after the rapid oxidation process ([of **col. 7, lines 58-67**]).

[Bracketed text and emphasis added.]

Note the reference to the nitride sidewall dielectric as being "supplemental". The word "supplement" or variations thereof does not appear in You '613. However, Appellant agrees with Examiner that it is "supplemental" because it comes second, after the formation of the first nitride film and because the "supplemental" second nitride film is unnecessary for performing the primary function of retarding Bird's Beak formation. The "supplemental" second nitride film is formed after the dry O<sub>2</sub> has been flowed.

Please also note that Appellant has inserted the word "[exposed]" into the above paraphrasing of Examiner contention D.2. Such insertion is justified because Claim 1 calls for "an ONO-type memory cell stack where at least one sidewall of the ONO-type memory cell stack includes at least three exposed material layers" [*emphasis added*]. Thus by necessity, the quoted ground of rejection implies a finding that the sidewall is "exposed". (See also Answer page 13, lines 13-14: "exposure of the ONO sidewall ... is clearly depicted in Fig. 2B of You '613" --this demonstrating that the grounds of rejection are predicated on a belief that You's sidewall 120a remains "exposed" until oxide film 120a of Fig. 2C is formed.)

Moreover, please note that You Fig. 2C does not show the "supplemental" or second silicon oxynitride film just as it does not show the primary, pre-oxidation nitride film. You has elected to not show these thin nitride coatings in his diagrams and the ordinary artisan will readily understand this. Accordingly, the Examiner's reference (again at Answer page 13,



lines 13-14) to the figures, and specifically his reliance on Fig. 2B as not showing the primary nitride overcoat and as thus "clearly depict[ing] ... the exposure of the ONO sidewall prior to the oxidation process" is without merit [*emphasis and bracketed text added, some text rearranged for grammatical flow*]. This is further reversible error. The text of You '613 indicates the presence of both nitride films even though Figs. 2B-2C do not show them.

The purpose of the second or "supplemental" silicon oxynitride film formed by the post-anneal is entirely different from that of retarding Bird's Beak as should be obvious because the supplemental oxynitride film is formed after oxidation. The purpose of the supplemental silicon oxynitride film is recited at You col. 7, lines 1-9 and has to do with reducing "trap sites" and making the already-formed sidewall oxide 116 "stable under stress".

That said, it is time to address You Fig. 4. Note that col. 7, lines 23-35 of You describe the "Heating" phase of Fig. 4 and they teach to include N<sub>2</sub> or N<sub>2</sub>O or NO in the atmosphere as the wafer is heated from T1 to the higher T2 temperature. The person of ordinary skill will understand that a nitride film must be formed on the sidewall of the ONO gate stack just as it was formed in the case of Fig. 3 because the laws of chemistry and physics do not change in response to linguistic relabeling of process steps. The nitride film might be thinner without the pre-anneal, but it is nonetheless formed. The nitrogen containing atmosphere is still present when the high temperature T2 is present near the end of the Fig. 4 "Heating" phase. The ordinary artisan will continue to recall You's title: "... Pre-annealing and/or Post-annealing In Nitrogen" [*emphasis added.*]. The ordinary artisan will continue to understand that if there was no protective nitride coating, then the dry O<sub>2</sub> described at col. 7, lines 36-47 would permeate through the exposed oxide sublayers of the ONO region (16 of Fig. 1) and produce the Bird's Beak "A" shown in Fig. 1 just as described at You col. 2, lines 27-41 ("However, the oxidizing agents may permeate from ... to the central portion B of the ONO layer 16 so that a bird's beak A may occur as shown in FIG. 1"). The physics of the situation do not change just because the authors of the You '613 document chose to call it "Heating" in Fig. 4. Of course, if the Examiner has it fixated in his mind to see otherwise, he will. Appellant asks the Board to see it from the perspective of the ordinary artisan who is skilled in the art and who thus understands that the nitride film acts as a diffusion barrier which retards inward permeation of oxygen and thereby reduces Bird's Beak formation.

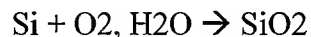
Part of the text that the Examiner relies on in You col. 7, lines 47-57 to support above Examiner contention D.1 states:

Hence, **when using the process for oxidizing the gate** for a short time using the single wafer rapid oxidation apparatus, **oxidizing agents do not appear to permeate into the end portions of the ONO layer 108, thereby reducing or minimizing the growth of the bird's beak** (see "C" in FIG. 2C)."

[Col. 7, lines 47-57, *emphasis added.*]

An issue to be resolved is how does the ordinary artisan (at the relevant time) rationally read the phrase "the process for oxidizing the gate" in this context and in view of the rest of the You disclosure? Recall that the terminology: "the process for oxidizing the [stacked] gate" and variations thereof are recited throughout You '613 (see again col. 5, line 66 for example) and consistently refer to the entirety of at least one of the Fig. 3 and Fig. 4 processes including the "Heating" phase. The person of skill will understand the "the process for oxidizing the gate" terminology as meaning that the ONO stack sidewall is pre-coated with a protective nitride film because that is the mechanism by which the results "C" of Fig. 2C are obtained whether by the method of Fig. 3 or by the method of Fig. 4. If the nitride overcoat is not present, then the result will be the undesirable Bird's Beak one of Fig. 1 regions "A" and "B".

There is one extent to which the Examiner's position can be found to be correct. You '613 does disclose an embodiment where the ONO stack sidewall is "exposed". That is the embodiment of Fig. 1. You '613 explicitly discloses the idea of using a wet oxidation in that Fig. 1 context. You provides the equation:



at col. 2, line 18. H<sub>2</sub>O means wet oxidation. Then in lines 27-41 of the same text, You goes on to explain why direct exposure of the ONO stack sidewall to either the dry or wet oxidation leads to the undesirable consequence of Bird's Beak formation because "the oxidizing agents may permeate ... to the central portion B of the ONO layer 16 so that a bird's beak A may occur as shown in FIG. 1".

You then explains why formation of Bird's Beak is undesirable:

As the thickness of the ONO layer 16 increases due to the bird's beak, the capacitance between the floating and the control gates 14 and 25, respectively, may be reduced. In addition, the programming speed and/or the cell current may be reduced. Furthermore, because the electric field may be concentrated at the portion where the ONO layer 16 is thin, dielectric breakdown of the ONO layer 16 may occur.

[Col. 2, lines 35-41]

This latter explanation is not necessary. Bird's Beak is an old and notorious problem that has plagued the semiconductor arts from its inception. The ordinary artisan well understands why Bird's Beak is undesirable and why You '613 is therefore teaching away from using a process (e.g., wet oxidation of the exposed ONO sidewalls of Fig. 1) that leads to formation of the undesirable Bird's Beak as shown in Fig. 1.

Despite the above mountain of evidence supporting Appellant's position, Examiner contention D.2 (reproduced at Reply page 8) persists with the unsupported theory that the desirable results "C" of Fig. 2C will be obtained even when the sidewalls of the ONO stack are "exposed" rather than being coated with a nitride film.

Of course, in this regard, the Examiner may have a clever counter (not yet articulated) that points to the fact that You col. 7, line 28 says "at least one of N<sub>2</sub>, N<sub>2</sub>O, NO, Ar and He are introduced into the chamber 250" [*emphasis added*].

To that hypothesized come back (not yet made), Appellant proactively responds here along a number of lines. First, to err is human. (See for example Answer page 6, five lines from the bottom. Clearly the Examiner meant Fig. 2B because in You Fig. 2C, the ONO structure is encased in the already formed oxide sidewall 116. So it's a mistake. Everybody makes mistakes. Appellant does not claim to be perfect and is ready to forgive obvious flaws in the writings of others.) But more to the point, the You '613 document is full of errors, many of them which are readily apparent to one skilled in the art. (See the "genes" in You col. 1, line 16.)

Second, the "at least one of" language interjected in You col. 7, line 28 is clearly lawyer talk. While erring may be human, to really foul things up usually takes the special

talents of a lawyer armed with legalese talk and perhaps some Korean to English translators. The cover page of You '613 evidences that it was most probably translated from Korean to English and was prosecuted by a law firm. It was not likely to have been directly written by the inventors: You et al., all Korean nationals. As the Supreme Court in KSR notes, the ordinary artisan is not a mindless automaton. He has common sense. Common sense dictates that the three inoperable ones of the numerous possible permutations under the rubric of "at least one of N<sub>2</sub>, N<sub>2</sub>O, NO, Ar and He" wherein only Ar and/or He are used is a mistake or an oversight that unintentionally arises from strict Boolean logic interpretation of the "at least one" phraseology. Moreover, the nonfunctional permutations are negated by the follow-on text in col. 7, lines 28-31 which says: "so that the growth of an oxide film is at least partially restrained". The person of skill will understand that undesired growth of oxide at the center of the ONO gate stack is best restrained by formation of the nitride diffusion barrier. Thus the three inoperable permutations of only Ar and/or He will be ruled out in the mind of the ordinary artisan as being obvious mistakes or inadvertent oversights. The ordinary artisan will instead see You's teachings as requiring that a nitrogen containing atmosphere must be present at T2 even in the embodiment of You Fig. 4 and thus the ONO stack sidewall of the Fig. 4 process is not "exposed" immediately before the dry O<sub>2</sub> is flowed. If it were "exposed", the undesirable Bird's Beak results of Fig. 1 would follow.

(Additional evidentiary support concerning the nitride diffusion barrier discussed here, is provided in the Rule 132 Declaration of Chiliang ("Larry") Chen at pages 10-11, paragraph 4k. See also You claims 22 and 24 wherein the heat up atmosphere is restricted to one that definitely contains nitrogen.)

So to repeat, Appellant asserts above that You '613 is full of errors or inadvertent oversights and that the ordinary artisan would read the You document with such an understanding in mind. It is only fair to point out some of the errors here. As indicated, the FIELD OF THE INVENTION paragraph at col. 1, line 16 states that the invention relates to "stacked **genes**". This is obvious error and the skilled artisan would understand it as such. You col. 7, lines 27-31 say "an inert gas including at least one of N<sub>2</sub>, N<sub>2</sub>O, NO, Ar and He are introduced into the chamber 250" [*emphasis added*]. Again, clearly the recited "N<sub>2</sub>, N<sub>2</sub>O, NO" are not noble "inert" elements given that the very same molecules chemically react in the

pre-annealing phase of Fig. 3 to form the nitride overcoat. The fact that they react to form the nitride overcoat belies the idea that they are "inert" gases. The skilled artisan would understand that this is another of numerous human oversights present in the You '613 document and would forgive them. The main point that the artisan would draw from You '613 is that a nitride overcoat should be formed prior to flowing the dry O<sub>2</sub> so as to thereby reduce or minimize Bird's Beak formation. See again the title of the You '613 patent: "... Using Pre-annealing and/or Post-annealing In Nitrogen" [*emphasis added*.] It's more than a clue. It's the gist of You's teachings.

Appellant's position is not based merely on argumentation of counsel. There are clear evidentiary underpinnings to Appellant's assertions. More particularly, the evidence of record includes the Rule 132 Declaration submitted by the non-inventor declarant, Chiliang ("Larry") Chen. The Rule 132 Declaration explains at pages 10-11, paragraph 4k thereof that:

4k. In fact, prior to the critical date, it would have been very clear to an artisan of ordinary skill that You '613 teaches at col. 6, lines 8-37 to use silicon nitride as a thin diffusion barrier on the sidewall of an ONO stack for precisely this purpose; for slowing down lateral permeation of oxygen into the interior of the stack during thermal oxidation of the sidewalls of his FG/ONO/CG stack 120 of Fig. 2B. You '613 implicitly teaches at col. 6, lines 36-37 that, were it not for the S [*sic*]-N bonds formed in his nitrogen pre-anneal step of col. 6, lines 8-25, that "oxidizing agents" would have "penetrate[d] into the central portion of the ONO layer 108 [in other words, deep into region "A" of You Fig. 1, reaching as far as the outer boundary of region "B"]" [Bracketed text added]. You '613 unequivocally teaches at col. 6, lines 29-35 that a film containing strong silicon-nitrogen bonds (S [*sic*]-N bonds) should be formed on the sidewall 102a of stack 120 before the stack is subjected to the thermal oxidation (to the "dry oxidation" of col. 6, lines 38-40). The pre-oxidation anneal in the nitrogen containing atmosphere causes the sidewalls in You's stacked gate structure 120 to be covered and protected by a thin nitride film **such that they are not directly exposed to the thermal oxidation environment**. In other words, You's stacked gate structure 120 does not have openly exposed oxide to serve as a gateway through which oxygen can readily enter laterally into the interior of the ONO structure to thereby quickly begin the process of Bird's Beak intrusion. You's ONO structure is covered on its sidewall with nitride before thermal "dry oxidation" is initiated at col. 6, lines 38-40. This aspect of You '613 is not ambiguous or open to reasonable debate. Instead, it is the whole basis of the invention described by You '613. You uses the thin nitride coating to slow down entry of laterally permeating oxygen into the regions between his FG and CG layers, and **to thereby reduce the Bird's Beak incursion as is shown in region "C" of You Fig. 2C**. Note that the amount of lateral incursion by material 116 of You

Fig. 2C into the interior of the stack is substantially less than lateral incursion by material 26 of You Fig. 1.

*[Emphasis not in the original but rather added here.]*

The non-inventor declarant, Chiliang ("Larry") Chen has established a factual predicate for his ability to opine on how, at the critical date, a person of ordinary skill would have read and understood You '613 without benefit of hindsight. See pages 1-3, paragraph sections 2a-2f of the Rule 132 Declaration of record.

By contrast, the Examiner has provided no evidentiary support into the record of an ability to ascertain how a person of ordinary skill would have read and understood the You '613 document at the critical time. Given this, Appellant asks the Board to find that there is substantial and overwhelming evidence in the record supporting Appellant's position that You '613 teaches to the person of ordinary skill at the relevant time who wants to reduce Bird's Beak that the sidewalls of the ONO stack should not be exposed but instead should be covered by a nitride film prior to beginning to substantially oxidize the sidewalls of the ONO stack with the start of a dry O2 flow at the high T2 temperature.

**(D.3) Reversible Error 1c: Further failure to correctly ascertain scope and content of prior art teachings**

At Answer page 9, lines 10-19 the Examiner asserts:

Appellant argues that ... the You '613 oxidation process must be a dry one, i.e., avoid use of hydrogen ... In fact, nowhere in You '613 does the reference teach that the sidewall oxide layer on the ONO stack has to be formed by a dry oxidation. In fact the oxide 116 can be formed by various methods (i.e., using O2 or a mixture of H2/O2 as the oxygen source, or by other methods involving exposing the ONO-type memory cell stack to an oxidant) The use of a dry oxidation process referenced in You '613 is mentioned only as one example of many different processes that could be used to produce the sidewall oxide film (i.e., "for example ..."). More importantly, nowhere in '613 does the inventor [You et al] exclude or preclude the use of wet oxidation process as a means of forming the sidewall oxide film.

*[Bracketed text and emphasis added.]*

There are several errors which Appellant wishes to address in the above reproduction (hereinafter "Examiner contention D.3")

Firstly, in a §103 rejection the issue is not what "can be" done, but rather what "should be" done in accordance with the guidance provided by the prior art. See for example, In re Imperato, 179 U.S.P.Q. 730, 732 (CCPA 1973). See also In re Rijckaert, 28 U.S.P.Q.2d 1955, 1957 (Fed. Cir. 1993).

Second, careful attention should be paid to exactly which oxide film is being discussed. If the Examiner had said that oxide film 26 of You Fig. 1 "can be" formed by various methods, Appellant would agree because You '613 does in fact teach that the Bird's Beak plagued oxide film 26 of You Fig. 1 is formed by the generic oxidation reaction of  $\text{Si} + \text{O}_2, \text{H}_2\text{O} \rightarrow \text{SiO}_2$  at col. 2, lines 14-41 when oxidation is executed at 600 °C or more for a long time.

However, the question is whether the ordinary artisan would understand You '613 to be teaching that the improved oxide film 116 of You Fig. 2C "can be/should be" formed by any of various methods, and there the answer must be a resounding no. You shows clear appreciation of the option for wet oxidation at col. 2, line 18. Yet You goes out of his way to counsel towards use of "dry oxidation" at col. 6, line 39. As mentioned above, the ordinary artisan is not an automaton (per KSR) and thus the ordinary artisan recognizes that the You '613 document was drafted by attorneys to include attorney hedge language such as "for example" and that the You '613 document is full of forgivable mistakes (e.g., "genes"). As such, the ordinary artisan would bypass the "for example" language and read You '613 as guiding away from presence of hydrogen. The Rule 132 Declaration of record explains that there is another reason why the ordinary artisan would avoid hydrogen and that is because of the metal silicide layer 112 that is part and parcel of You's "structure" in Figs. 2B-2C.

Of course, there is always the boilerplate response about Appellant attacking the references individually whereas under §103 ... etc., etc. The issue here though is not simply about what is taught in the one You reference. Rather the issue is whether appreciation existed at the critical time in the mind of the ordinary artisan so as to cause the proposed combination of You '613 and Wang '102 to become apparent (obvious) to that ordinary artisan. Appellant respectfully submits that You '613 and Wang '102 teach away from one another. Appellant submits that the proposed combination is purely a result of hindsight appreciation of Appellant's invention as is further detailed in the next section.

**(D.4) Reversible Error 2: Picking and choosing out of the references only that which will support the preconceived conclusion of obviousness (a tell tale sign of falling into the ever-tempting zone of hindsight)**

At Answer page 10, lines 12-18, the Examiner insists that Appellant has it all wrong by stating the following (hereafter "Examiner contention D.4"):

However, a reduction in Bird's Beak formation cannot be found in any of Appellant's claims, and furthermore **is not the motivation of the Examiner** to combine You '613 and Wang '102. Rather Examiner's motivation to combine You '613 and Wang '102 is rooted in the **fact** that **any** generic ISSG process has ***excellent*** thickness control **and** a reduction of *thermal budget* as **inherent** properties **regardless** of the context in which the process is used. This is evident to **any** artisan that is skilled in the art.

*[Emphasis added.]*

Once more Appellant respectfully reminds the Board that the Title of You '613 ends with the phrase, "Pre-annealing and/or Post-annealing In Nitrogen" *[emphasis added.]* Appellant contends that the formation of the nitride overcoat prior to dry flowing of O2 is the primary teaching and fundamental understanding that the ordinary artisan would extract from a fair reading of You '613. The Examiner wishes to selectively erase that basic fact from consideration.

The Examiner inherently argues that the ordinary artisan would selectively repudiate You's teachings to first form a protective nitride film around the exposed ONO sidewall. The Examiner does not explain WHY the ordinary artisan would selectively repudiate this clear and unmistakable teaching of You to cover the ONO gate stack sidewalls with a nitride by "Pre-annealing and/or Post-annealing In Nitrogen" *[emphasis added]* as indicated by the title.

At page 11, paragraph 4L, the Rule 132 Declaration of record declares:

4l. Given the above, it is my opinion based on my experience and educational background that a person of ordinary skill in the art, at or before the critical date, would have understood You '613 to be clearly teaching the following:

- Do not leave an open or exposed silicon oxide surface on the sidewall of the ONO stack structure as you are about to begin thermal oxidation, but instead cover all such entrances or gateways for lateral



permeation of oxygen with an oxygen diffusion barrier such as silicon nitride; and

- Use a dry oxidation with O<sub>2</sub> (no hydrogen in the oxidizing atmosphere) for simultaneously oxidizing the nitride-covered sidewalls and for annealing lateral ends of the ONO structure so as to thereby relieve any mechanical stress induced by the limited amount of Bird's Beak incursion (region "C" of You Fig. 2C) that does occur.

*[Emphasis added.]*

The Rule 132 Declaration gives detailed supporting reasons for all these conclusions in for example, preceding paragraphs 4c-4m.

By contrast, the outstanding grounds of rejection give no reasons for why the ordinary artisan would pick and choose by selectively repudiating the clear and unmistakable teachings of You to cover the ONO gate stack sidewalls with a nitride.

The outstanding rejections give no reasons for why the ordinary artisan would selectively repudiate the clear and unmistakable teaching of You to use a "dry" oxidation process.

It is well established law that selective picking and choosing without explanation is the hallmark of hindsight rationalization.

See for example, In re Hedges 228 U.S.P.Q. 685, 687 (Fed. Cir. 1986) ("[T]he prior art as a whole must be considered. The teachings are to be viewed as they would have been viewed by one of ordinary skill. ... **It is impermissible within the framework of section 103 to pick and choose** from any one reference only so much of it as will support a given position to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art."). See also Ex parte Clapp, 227 U.S.P.Q. 972,973 (PTO Bd. Appls., 1985).

The outstanding rejections give no factual underpinnings to support the blanket and all sweeping allegations made in Examiner contention D.4 that "**any** generic ISSG process has *excellent* thickness control **and** a reduction of *thermal budget* as **inherent** properties **regardless** of the context in which the process is used".

Moreover, it is not understood what the word "excellent" implies. The American Heritage® Dictionary of the English Language: Fourth Edition (2000) defines "excellent" as an adjective meaning, "of the highest or finest quality; exceptionally good of its kind." The outstanding grounds of rejection have provided no proof that ALL generic ISSG processes provide thickness control of the highest or finest quality. Moreover such an assertion defies common sense. How could they all be of the highest or finest quality? Surely at least one must be of lesser quality than another.

If truth has to be told, both Appellant and the Examiner need to make up (to fabricate) stories about how the mythical PHOSITA (person having ordinary skill in the art) would have behaved at the critical time --although the Examiner has prima facie burden of going first. There is no other option to make up a story. PHOSITA lives only in the past. He (or she) is a fictional character. PHOSITA cannot be brought on the witness stand and deposed. In the KSR decision, the U.S. Supreme Court apparently understood this when they cautioned that there must be "rational underpinnings" to the made up stories proffered by the opposed parties when arguing over §103 obviousness. The term, "rational underpinnings" implies that there is evidentiary support for findings of fact followed by well reasoned argumentation as to how those facts lead to the conclusions that PHOSITA would have acted one way as opposed to another.

In his finding of facts (in the above Examiner contention D.4), the Examiner insists that "This is evident to any artisan that is skilled in the art," where the "This" language apparently refers to the broad sweeping and unsupported statements about the "inherent" finest/highest quality properties of all generic ISSG processes in all manner of context when it comes to providing thickness control and reduction of thermal budget.

By simple logic, the Examiner's reference to "any artisan" must include the Declarant of the on-file Rule 132 Declaration. That Declarant has established his bona fides as one skilled in the art at the relevant time. The Declarant has further rebutted each and every aspect of the Examiner's position regarding generic use of ISSG processes. For example in paragraph 4e, the Rule 132 expert testifies: "In my professional opinion this statement [about excellent thickness etc.] is technically incorrect and without basis in Wang '102. Wang never promises or suggests that a "dry" version of his ISSG process will provide excellent thickness control for every situation. Moreover, a "dry" ISSG that does not have enough hydrogen flow to

sustain a stable hydrogen flame [and] will tend to increase consumption of the thermal budget rather than decreasing it." Accordingly it is seen from the record that the Examiner's fact finding about "any artisan" is simply not true and thus constitutes reversible error.

More broadly speaking, the outstanding grounds of rejection overlook all the facts that contradict its ultimate conclusion and never justifies any of the selective cherry picks it makes along the way.

It has been pointed out numerous times to the Examiner that Wang '102 teaches to have high concentrations of oxygen radicals in the ISSG process. Wang states at [0031]:

According to the invention, the rate of oxide growth on silicon nitride in the ISSG (that is, thickness of grown oxide versus thickness of silicon nitride consumed) exhibits a strong correlation with atomic oxygen (oxygen radical O.) concentration, and not to any other atomic or molecular species. The oxygen radical O. concentration ... depends upon pressure, temperature, and relative amount of hydrogen in the chamber"

*[Emphasis added, some text skipped].*

At paragraph [0032], Wang continues:

The oxygen radical peak concentration results from a balance of radical generation through molecular collisions that are strong functions of temperature and pressure, and recombination processes that are strong functions of pressure or flow rate in the chamber. Accordingly, the ISSG process depends upon using process pressure, flow rate and temperature in the chamber within specified ranges"

*[Emphasis added].*

At paragraph [0051] Wang '102 explains:

As will be appreciated from the foregoing, suitable values for one or more of the parameters will differ according to the values of one or more other parameters. Generally, for instance, the processing time can be reduced at higher processing temperatures. And, for instance, for any given processing temperature the processing time can be less at higher proportions of H<sub>2</sub> to O<sub>2</sub> in the gas mixture.

*[Emphasis added].*

In other words, Wang directly suggests to the ordinary artisan to have higher rather than lower H<sub>2</sub>/O<sub>2</sub> ratios so as to thereby reduce processing time and assure that "peak concentrations" of O. radicals will be generated. All this directly contradicts much of what Examiner contention D.4 (above) alleges.

The outstanding grounds of rejection refuse to explain why PHOSITA would ignore the primary aspect of You '613 (to cover with nitride), why PHOSITA would ignore the primary aspect of Wang '102 (to have large, peaked concentrations of O radicals, which indirectly means a high H<sub>2</sub>/O<sub>2</sub> ratio, a stable hydrogen flame and long-lived radicals) and why Appellant's Rule 132 is unpersuasive.

All these selective pick and choose avoidances of inconvenient facts and evidence constitute lack of rational underpinnings and strongly point to resort to hindsight and to the selective cherry picking of only the confirmatory once one has become engulfed in the wake of an addictively tempting wave of hindsight and has become convinced that there is but one possible truth.

At page 10, lines 12-13, the Examiner's Answer counters that Bird's Beak is not recited in the claims. That misses the point. First, there would be no benefit to reciting the intent of reducing Bird's Beak in the claims because intent does not alter the physical process recited in the claims.

Second, the prima facie issue at hand is what the ordinary artisan would glean from a fair reading of You '613, what the ordinary artisan would glean from a fair reading of Wang '102 and whether after having gathered the individual teachings of You '613 and Wang '102, the ordinary artisan would have an objectively rational motivation to try and combine those teachings with an eye towards an apparently positive outcome arising from the theoretical combination. That simply has not been shown.

Moreover, **Wang '102 shows that severe Bird's Beak results in Fig. 6** from use of Wang's ISSG.

The Examiner's Answer proposes to turn a blind eye to this fact at Answer page 13, lines 1-8. However, it should be clear that oxide region 634 of Wang Fig. 6 corresponds directly to oxide region 434 of Wang Fig. 4F. Both result from application of Wang's ISSG

process to the structure of Wang Fig. 4E (where buried source/drain region 432 is oxidized so as to produce corresponding source/drain region 632 in Wang Fig. 6).

What the ordinary artisan would clearly see in Wang Fig. 6 is a single FET having a source region 634 on the left, a drain region 634 on the right, a polysilicon gate 638 disposed above, and then, disposed between the gate and the channel region there is an ONO gate insulation layer 624/627/628 whose structure is substantially **warped by the Bird's Beak formation 634 that was generated when Wang's ISSG process was applied.**

Wang's ONO gate insulation layer 624/627/628 of Fig. 6 directly corresponds to Wang's ONO gate insulation layer 424/427/428 of Figs. 4F-4G. Wang's poly gate layer 638 of Fig. 6 corresponds to Wang's poly gate 438 of Fig. 4G.

The Examiner attempts to bury these self-evident truths by spin-doctoring the illustrated structure into a so-called "isolation structure" at Answer page 13, line 4 and claiming that it is intentionally "formed to provide an electrical isolation between rows of cells (i.e., ... memory cells ...)". However the Examiner provides no collaborating documentation for this non-official notice line of argumentation.

Fig. 6 does not show a stacked gates memory cell. It shows a single FET-type transistor having a single poly gate. Moreover, Wang '102 labels region 404 as the trench isolation structure and not 634 (see Wang paragraph [0037]). Items 634 are labeled as the source/drain oxides in Wang paragraph [0041] and they are stated to have been formed simultaneously with oxide layer 628 when the RTO based ISSG process was used.

It is seen from the above that once again, the Final Office action is caught in the act of fabricating assertions out of thin air while Appellant plows forward by rationally pointing time and again to incontrovertible facts. This contest between drummed up assertions and fact-based replies repeats over and again in the prosecution of the present claims. The Board is respectfully asked to put an end to the game.

It is respectfully requested that the Board find that Wang Fig. 6 clearly shows that severe Bird's Beak results from use of Wang's ISSG process and that the ordinary artisan would clearly see this. It is respectfully requested that the Board find that You '613 teaches

the ordinary artisan to avoid Bird's Beak. (See You col. 2, lines 35-41.) Thus You and Wang clearly teach away from one another. It's as simple as that.

**(D.5) Reversible Error 3: Ignoring Rebuttal Evidence**

At Answer page 8, first full paragraph, the Examiner insists that the Rule 132 Declaration is merely an "argument" presented by the inventor. The Examiner writes as follows (hereafter "Examiner contention D.5"):

The arguments in the Declaration **are the same** as the Appellant arguments (Appeal Brief); therefore they have been treated together. The Declaration is based on the opinion and education of the inventor.

[Emphasis added.]

It is well established that failure to properly treat rebuttal testimony is reversible error. See In re Alton, 76 F.3d 1168; 37 USPQ2d 1578, (Fed. Cir. 1996) ("We do, however, hold that the examiner's final rejection and Answer contained two [reversible] errors: (1) viewing the Wall declaration as opinion evidence addressing a question of law rather than a question of fact; and (2) the summary dismissal of the declaration, without an adequate explanation of why the declaration failed to rebut the Board's prima facie case of inadequate description. ... In short, the examiner rejected Dr. Wall's opinion that "a skilled worker ... would, in 1983, have understood ..." The examiner maintained this position in his Answer. ... We do not read the declaration as asserting an opinion on the patentability of the claimed ... Rather, the declaration is offering factual evidence in an attempt to explain why one of ordinary skill in the art would have understood ... Dr. Wall's use of the words "it is my opinion" to preface what someone of ordinary skill in the art would have known does not transform the factual statements contained in the declaration into opinion testimony. Consequently, the examiner's dismissal of the declaration on the grounds that "little weight is given an opinion affidavit on the ultimate legal question at issue" was [reversible] error. [Emphasis added, order of text rearranged and some skipped to improve readability]). Additionally see footnote 10 of In re Alton: "In any event, we are aware of no reason why opinion evidence relating to a fact issue should not be considered by an examiner. See Ashland Oil, Inc. v. Delta Resins &

Refractories, Inc., 776 F.2d 281, 294, 227 U.S.P.Q. (BNA) 657, 665 (Fed. Cir. 1985), cert. denied, 475 U.S. 1017, 89 L. Ed. 2d 315, 106 S. Ct. 1201 (1986)."

See also, In re Sullivan, 498 F.3d 1345; 84 USPQ2d (Fed. Cir. 2007) (Because the Board failed to give any weight to the rebuttal evidence of record, we vacate the Board's decision and remand for further proceedings. ... When a patent applicant puts forth rebuttal evidence, the Board must consider that evidence. See *In re Soni*, 54 F.3d 746, 750 (Fed. Cir. 1995) (stating that "all evidence of nonobviousness must be considered when assessing patentability") ... Whether the composition would have been obvious cannot be determined without considering evidence attempting to rebut the prima facie case. ... That declaration [of Dr. Damon Smith, an expert involved in developing antivenoms] therefore is relevant as **evidence that the prior art taught away** from the claimed invention. ... Furthermore, the Board's focus on the intended use of the claimed composition misses the mark.)

With regard to the Answer concluding that the Rule 132 Declaration is "based on the opinion and education of the inventor", this is clear error because declarant Chiliang ("Larry") Chen is not one of the named inventors.

With regard to Examiner contention D.5 contending that the Rule 132 is based on "opinion", it is respectfully submitted that there is no credible way of describing how the mythical PHOSITA would have acted except by expressing an "opinion". Had the Declarant stated it as absolute fact that PHOSITA would act this way or that at the relevant time, then the Examiner would have had good reason to challenge the credibility of the testimony. On the other hand, since the declarant has established in paragraphs 2a-2f that he was in the industry at the critical time (filing date) and that he worked with others in the art, there is good basis for rendering a professional opinion regarding how PHOSITA would have behaved. By contrast, the Answer and outstanding rejections provide no factual predicate for the Examiner knowing how PHOSITA would have behaved. In short, the outstanding grounds of rejection have no factual support and no rational underpinnings.

As indicated in In re Sullivan (*supra*), when a Declarant explains why the prior art teaches away, that must always be considered as rebuttal evidence and must be addressed. In the present case at paragraph 4d, the Declarant explains one reason why You teaches away. (The Answer insinuates at page 8, 5th line from the bottom that Declarant is not credible

because he does not back up every detail with "objective documentation".) At paragraph 4i the Declarant explains why the ordinary artisan would shy away from untested variations of ISSG. Additionally at paragraph 4m the Declarant explains "since it is not clear how Bird's Beak formation would proceed if a method other than dry oxidation were tried in the situation presented by You '613, an ordinary artisan would be motivated away from randomly trying alternate methods of sidewall oxidation. Accordingly, You '613 guides the ordinary artisan away from contemplating the use of ISSG or other non-dry, thermal oxidation processes" [*emphasis added*].

**(D.6) Reversible Error 4: Failure to appreciate the claimed invention**

At Answer page 9, end of the top paragraph, the Examiner challenges the logic of Claims 26 and 27, implying that they somehow contradict Claim 1.

Appellant can go on and on with poking at detailed instances where the Answer demonstrates a failure to grasp the claimed invention as well as the teachings of the applied references. The whole point is that applicants discovered through nonroutine experimentation that an "unstable" ISSG process provides surprising and unexpected results. At paragraph 5m, the Rule 132 Declaration indicates that the results are "unexpected". The fact that the Answer can in hindsight and at page 6, middle full paragraph (and also at page 14) explain the physics of short lived radicals after having garnered that insight from Applicants' disclosure proves nothing. The issue is one of what the ordinary artisan would have proactively seen prior to the critical date, not what the Examiner can see in retrospect after having read Applicants' disclosure.

With regard to the Examiner's reliance on In re Woodruff at page 7, last 3 lines of the top paragraph in the Answer, the specification does demonstrate unexpected results. It was not expected that an unstable hydrogen flame would produce beneficial results. With regard to Claim 12, the results were obtained through nonroutine experimentation. They could not have been reasonably expected by merely conducting thinking experiments.

With regard to the Examiner's reliance on In re Aller at page 7, line 2 of the Answer, the record evidence does not establish that ordinary artisans "routinely" experiment with



every variation of every conceivable oxidation process in order to find the optimum one for use in sidewall oxidations. "Routine" means that you do it as a matter of habit, as an every day repeated process. No evidence has been presented that every day ordinary artisans conduct such experiments every day. By contrast, the Rule 132 Declaration explains why the ordinary artisan would stick with the tried and true HTO process or the dry-only process proposed by You '613.

With regard to the Examiner's reliance on "thermal budget" as a key aspect of the supplied motivation, the Rule 132 Declaration explains why an unstable hydrogen flame goes against the idea of improving thermal budget. Appellant should not have to repeat this line of argumentation yet again. Instead it is the Examiner's burden to explain why, in spite of the ordinary artisan's understanding that a stable hydrogen flame is needed to reduce the draw on thermal budget (presumably for the overall wafer), the artisan would have nonetheless resorted to the unstable dry parameters set forth in the claims.

With regard to the Examiner's insistence (Answer page 9, bottom paragraph) that "for example" in You '613 before the recitation of dry oxidation with O<sub>2</sub> gas guides the ordinary artisan to try everything including all manner of wet oxidations, this simply goes against the common sense of the ordinary artisan. The ordinary artisan is charged with technical understanding of the nuances and differences amongst the different oxidation processes. They don't all look alike to the skilled artisan. Therefore the skilled artisan would understand "dry" to be taken as a warning against using hydrogen.

**(D.7) Reply to §112 Answers**

At Answer pages 8-9, the Examiner makes some stabs at Appellant's response to the §112 rejections. With regard to Claim 11, the Examiner asserts that Appellant is merely stating an "opinion" and does not provide any corroboration. However, as pointed out above, a Rule 132 Declaration is not merely "opinion". It is testimonial evidence. The evidence is that the ordinary artisan would understand why hydrogen should not be used when a metal silicide layer is present. It appears that the Examiner wants all patent applicants to make exhaustive lists of what is not in their disclosed embodiments. This is impractical.

With regard to Claims 26-27, the Examiner asserts that these appear to contradict Claim 1. Appellant has already explained this point above. The specification indicates that the hydrogen flame is unstable if H<sub>2</sub>/O<sub>2</sub> is below 0.3. Claim 1 calls for an H<sub>2</sub>/O<sub>2</sub> ratio below 0.3 and thus Claim 1 calls for an unstable flame. There is no contradiction.

### CONCLUSION

This Reply Brief responds to specific points raised by the Examiner's Answer. It once again points out that Appellant's position is supported by evidence whereas the outstanding grounds of rejection are based on selective picking and choosing that ignores the totality of evidence. Thus it is respectfully submitted to the Board that, when the totality of weights of "evidence" in the present case are placed on opposing sides of the scales of justice, the weight of evidence clearly tips in favor of a finding nonobviousness and patentability. In light of the foregoing, Applicant once again respectfully requests that the outstanding grounds of rejection be reversed and the claims be deemed allowable in light of the evidence and argumentation of record.

The Director is authorized to charge any underpayment or credit any overpayment to Deposit Account No. 50-2257 for any matter in connection with this response, including any fee for extension of time and/or fee for additional filings (e.g. for Reply Brief) which may be required for maintaining pendency of the application and/or of the appeal.

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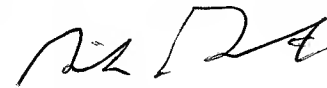
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